ADDENDUM D

HAZARD TREE MANAGEMENT

HAZARD TREE MANAGEMENT

Goal and Objectives

1. Manage hazard trees for public safety.
    - Reduce human induced tree damage and hazard creation
    - Monitor park trees on a regular basis, inspecting as warranted
    - Prune or reduce high hazard trees

Hazard Tree Assessment

A hazard tree assessment was conducted for Seward Park in June, 2004. All trees capable of falling in pedestrian and traffic zones were assessed for their probability of failing and causing physical or monetary damage to the public in whole or to Parks structures. A hazard ranking was assigned to all trees meeting the established hazard ranking criteria. This included a high probability of failure, identifiable by poor health, significant die-back, problematic tree structure, root damage, visible cankers, rot, disease or pest infestations. A problematic tree would also need to have a high probability of falling on an obvious target, such as a high traffic area, playground, parking lot, picnic area or building. Trees within the interior of the Park's forest were identified as Interior Forest Trees. The results of this assessment were transferred to an ESRI shapefile format and a hazard tree map was created in July, 2004. (See Hazard Tree Map) See the attached Seward Park Hazard Tree Inventory at the end of this section for details on each tree.

Issues and Implicated Concerns

Eighty five trees have been identified by Park staff as having greater than normal potential for failure in or near human use areas. Of these, 25 are along the interior trails of the Park, no actions are proposed for these trees.. Actions are proposed for the 60 trees in the highly occupied areas of the Park. The process of identifying and abating hazard trees will be an ongoing part of Park Management.

- Without removal or remediation of hazard trees, certain areas of the Park may need to be closed to public access for safety reasons.
- Removal of hazard trees will create openings in the forest that may invite invasive species and may well affect the visual and habitat value of the park.
- Visitor safety and tree health need to be balanced against the ecological rarity and importance as well as aesthetic value of trees.
- Removal of hazard trees will provide opportunities for forest regeneration.
- Hazard Tree Assessments may be required on a more frequent basis as the Park Trees age.

Management Recommendations

SPR staff will handle hazard tree inspection, abatement and monitoring on a continuing basis, according to standard Parks procedures.

<u>Main Objectives:</u>

1. Improve park safety
2. Improve forest health by replanting after hazard abatement

<u>Priority Actions:</u>

1. Close informal trails near decadent trees.
2. Conduct visible and frequent public education programs.
3. Conduct periodic monitoring of trees by SPR certified arborist
4. Maintain proactive hazard tree remediation program
5. Evaluate identified hazard situations in playground and highly trafficked forest edges and take appropriate management action.

6. When reducing a tree to abate a hazardous situation, make every effort to leave a good portion of the tree in the upright position as a snag.
7. Recycle other debris as woodchips or scattered down woody debris.
8. Replant appropriate trees and/ native shrubs to fill gaps.
9. Train maintenance staff to recognize conditions which could create a hazard.

Priority Areas:
1. Zone 100 Playground
2. Area D, Mixed Native/non-native forest

Prioritized Actions

Hazard trees are shown on the Management Area map at the end of this VMP. Numbers correlate to Hazard Tree Inventory data included in this Appendix as well. To check proposed actions for particular trees, consult data summary by tree number. Removals will be signed well in advance for public comment (2-4 weeks), following detailed evaluation of alternative risk reduction options by SPR Senior Forester. This work constitutes "catch up" tree risk reduction; annual monitoring will identify additional hazards in future years, but numbers will be greatly reduced. Trees marked as Interior Forest Trees will be reviewed periodically for health only.

Note that some trees identified for inspection / monitoring may need to be removed or habitat-reduced as a result; also, several trees are identified both for pruning and inspection so total actions do not equal total tree count per phase.

Figure 14
Trees Occurring outside of Interior Forest

Remove	Create Habitat	Prune	Inspect/monitor
16	14	20	10

Management Practices

Hazard tree management work will be done only by Parks staff or contractors using existing practices, and as approved by SPR Senior Urban Forester. Approved methods in which to manage hazard trees in parks are located in the Department Policy and Procedure for Tree Management, Maintenance, Pruning and/or Removal (Tree Policy, 2001). As outlined in the previous chapter, there are four recommended actions for hazard trees in Seward Park:

Monitoring

There are several targets in Seward Park, and trees can change in health and stability over a relatively short period of time. It is essential for Urban Forestry Staff to perform annual monitoring of all trees near identified target areas. The list of hazard trees created in this VMP can be used as a baseline, but it is important that staff observes any changes to adjacent trees that did not appear to have issues at the time of this assessment. These methods should be useful tools for staff to repeat in the field at any time.

Inspection

In some trees, the extent of decay could not be detected by visual inspection, and therefore, no determination of the trees' condition was made. Other more invasive evaluation methods, such as the Resistograph®, increment borer, or a small-gauge bit drill, should be utilized to assess the amount of sound wood present in strategic parts of the tree. The type of assessment is usually performed by a certified arborist or forester equipped with that kind of instrumentation.

Other trees, indicated as needing "inspection" in this VMP, may need only a visual assessment by the Maintenance Staff and discussion of whether the situation requires a more extensive evaluation using the above methods.

Pruning

All tree pruning is to be done by Parks staff. Most of the pruning prescribed for hazard trees in Seward Park is limited crown cleaning, to remove only dead, dying, and diseased branches. These actions are considered helpful to maintaining the trees vigor and health. The removal of dead or decayed portions of the tree can include large parts such as stems and scaffold branches in order to retain the rest of the tree. In such cases, it may be impossible to make a pruning cut without exposing the interior of the tree but is the preferred choice over complete removal of a tree.

For some trees, the healthiest part of the tree is the upper branches, and the areas of concern are decayed trunks at branch attachments or at the base and root system. If the branches are over "targets" (shelters, playground, roads, etc.), reducing branch length and weight with thinning cuts is recommended. As with all pruning, frequent monitoring is required to detect any change in tree health or a negative response to the work.

Removal

For hazard trees identified in the park, removals are only recommended when there is no other action by which to lower the probability of failure to a safe and acceptable level. Determinations of risk of failure are made using ISA standard protocols for hazard inspection. Removal can include lowering a tree to a safe height by creating a snag for wildlife habitat. Tree removal on a steep slope should leave stump and root ball intact and avoid any soil disturbance. The root system can continue to perform well binding the soil and helping stabilize the slope for several years after felling.

With all removals, replacement planting should be considered. If the area is to be minimally disturbed, planting adjacent to the removal is an option. In root disease pockets, it is essential to plant disease resistant tree species. For areas where stand thinning is beneficial to overall forest health, replanting with shrubs and groundcover can be the best option. Removals are not considered for trees within the Interior Forest.

Estimated Costs

HAZARD TREE MANAGEMENT				
	Monitoring	Park-wide	$3,000 annual	Ongoing
	High Hazard Tree Mitigation	Park-wide	$90,000	2005-2007

Seward Park Hazard Tree Inventory

June 2004 Inventory

ID	Species	Trunk diameter (inches)	Target(s)	Occupied	Tree health	Canopy quality	Defect (s)	Disease/ Pest	Hazard rank	Primary action	Interior Tree	Tag location	Comments	Photo
1	*Acer macrophyllum*	67	playground, trail	freq	poor	dieback	B T R	observed	very high	reduce - habitat tree	No	south	Work completed summer, 2004	A
2	*Arbutus menziesii*	26	playground, trail	freq	dead	dieback	B T C	observed	very high	reduce - habitat tree	No	north	Almost dead	B
3	*Fraxinus species*	19	public beach, road	freq	poor	dieback	B T C	observed	very high	remove	No	north		C
4	*Fraxinus species*	20	playground, picnic table	some	poor	dieback	T C R	observed	high	monitor - remove?	No	east		D
5	*Pseudotsuga menziesii*	31	playground	always	fair	-	B T	observed	very high	inspect - resistograph	No	south		E
6	*Arbutus menziesii*	41	road	freq	fair	dieback	T C R	observed	very high	inspect - resistograph	No	south		F
7	*Liriodendron tulipifera*	17	picnic table, road	freq	dead	dieback	B T	observed	very high	reduce - habitat tree	No	south	Removal order 7/8/2004	G
8	*Populus alba*	24	picnic table, trail	freq	fair	dieback	T R	observed	high	prune - remove?	No	south		H
9	*Populus alba*	33	picnic table, trail	freq	fair	dieback		none seen	high	prune	No	south	One large branch	I
10	*Acer macrophyllum*	50	picnic table, trail	freq	dead	-	B T	observed	very high	remove	No	north	Removal order 7/8/2004	J

ID	Species	Trunk diameter (inches)	Target(s)	Occupied	Tree health	Canopy quality	Defect (s)	Disease/ Pest	Hazard rank	Primary action	Interior Tree	Tag location	Comments	Photo
11	*Arbutus menziesii*	29	shelter, trail	freq	fair	dieback	T R	observed	high	inspect, prune	No	north	Remove dead branch over trail	K
12	*Arbutus menziesii*	29	shelter, trail	freq	poor	dieback	T	none seen	high	inspect, prune	No	-	Remove dead branch over trail	L
13	*Arbutus menziesii*	25	shelter, trail	freq	good	-	T	none seen	high	inspect, prune	No	-	Remove dead branch over trail	M
14	*Arbutus menziesii*	25	trail	freq	dead	dieback	T	none seen	high	inspect, prune	No	-		N
15	*Arbutus menziesii*	20	trail	freq	dead	dieback	T	none seen	high	inspect - remove?	No	-		O
16	*Platanus acerifolia*	29	picnic table, trail	freq	poor	-	R	observed	very high	remove	No	east		P
17	*Arbutus menziesii*	24	building	freq	dead	dieback	T	none seen	high	inspect, habitat tree	No	-	dead	Q
18	*Arbutus menziesii*	16	trail	freq	dead	dieback	T	none seen	high	inspect, habitat tree	No	-	dead	R
19	*Arbutus menziesii*	22	trail	freq	dead	dieback	T	none seen	high	inspect, habitat tree	No	-		S
20	*Arbutus menziesii*	16	trail	freq	fair	dieback	T	none seen	high	inspect, prune	No	-		T
21	*Arbutus menziesii*	15	trail	freq	fair	dieback	T	none seen	high	inspect, prune	No	-		U
22	*Thuja plicata*	21	shelter	some	fair	dieback		none seen	high	inspect, monitor	No	north	Main leader dieback	V

ID	Species	Trunk diameter (inches)	Target(s)	Occupied	Tree health	Canopy quality	Defect (s)	Disease/ Pest	Hazard rank	Primary action	Interior Tree	Tag location	Comments	Photo
23	*Arbutus menziesii*	25	picnic table	freq	dead	dieback	T	none seen	high	inspect, habitat tree	No			w
24	*Arbutus menziesii*	27	trail	freq	dead	dieback	T	none seen	high	inspect, habitat tree	No			X
25	*Arbutus menziesii*	15	trail	freq	poor	dieback	T	none seen	high	inspect, habitat tree	No			Y
26	*Arbutus menziesii*	12	trail	freq	dead	dieback	T	none seen	high	inspect, habitat tree	No			Z
27	*Arbutus menziesii*	12	trail	freq	fair	dieback	T	none seen	high	inspect, prune	No			AA
28	*Arbutus menziesii*	34	trail	freq	fair	dieback	T	observed	high	inspect, prune	No	north	Trim west branch	BB
29	*Pseudotsuga menziesii*	36	trail	freq	fair	dieback	T	none seen	high	inspect, habitat, monitor	No	north	Top leader dieback	CC
30	*Arbutus menziesii*	11	trail	freq	dead	dieback	T	none seen	high	inspect - remove?	No	north		DD
31	*Pinus sylvestris*	12	trail	some	poor	dieback	B	observed	very high	reduce - habitat tree	No	west	Bark beetle	1
32	*Acer macrophyllum*	8 to 21"	trail	some	poor	dieback	B T	observed	very high	prune	Yes	south	Multi-trunk (6)	2
33	*Pseudotsuga menziesii*	39	trail	some	poor	dieback	B T C	observed	low	monitor	Yes	east		3
34	*Pseudotsuga menziesii*	41	trail	some	fair	dieback	B R	observed	low	inspect	Yes	north	sap	4
35	*Thuja plicata*	33	trail	some	poor	dieback	B	observed	Low	inspect	Yes	west		5
36	*Acer macrophyllum*	29	trail	some	poor	dieback	T C R	observed	low	Monitor	Yes			6

ID	Species	Trunk diameter (inches)	Target(s)	Occupied	Tree health	Canopy quality	Defect (s)	Disease/ Pest	Hazard rank	Primary action	Interior Tree	Tag location	Comments	Photo
37	*Thuja plicata*	55	trail	some	fair	dieback	B T C	observed	high	inspect - resistograph	Yes	east	Fire damaged trunk	7
38	*Pseudotsuga menziesii*	25	trail	some	dead	dieback	B T	observed	Low	inspect	Yes	south		8
39	*Pseudotsuga menziesii*	33	trail	some	dead	dieback		observed	Low	Monitor	Yes	south	Snag/lean s over trail	9
40	*Pseudotsuga menziesii*	60	trail	some	fair	dieback		observed	Low	inspect	Yes	east	Fire damaged trunk	10
41	*Pseudotsuga menziesii*	21	trail	some	poor	asymet	T C R	none seen	low	monitor	Yes	north	Leaning against another Doug. Fir	11
42	*Pseudotsuga menziesii*	26	trail	some	fair	asymet	B T	none seen	low	monitor	Yes	north	Major lean over trail	12
43	*Thuja plicata*	21	trail	some	poor	dieback	B T C	observed	low	monitor	Yes	south		13
44	*Tsuga heterophylla*	20	trail	some	dead	dieback	B T C	observed	Low	Monitor	Yes	west	snag	14
45	*Alnus rubras*	9	road	some	dead	dieback	T	none seen	very high	Trim	No	south	dead	15
46	*Arbutus menziesii*	17	trail	freq	poor	dieback	B T	none seen	very high	remove	No	west		16
47	*Arbutus menziesii*	13	trail	freq	dead	dieback	B T C	observed	very high	remove	No	west	Dead/ rotting	17
48	*Acer macrophyllum*	14,10	trail	freq	dead	dieback	B T	observed	very high	remove	No	-	Dead/ forked at base	18
49	*Thuja plicata*	21	building	freq	poor	dieback	B T C	observed	very high	remove	No	west	Bathroom	19
50	*Pseudotsuga menziesii*	66	trail	freq	fair	-	T C R	observed	low	inspect	Yes	south	Old growth/ fire damage	20
51	*Tsuga heterophylla*	21	trail	freq	dead	dieback	T	observed	Low	Monitor	Yes	east	Top leader will fail	21

ID	Species	Trunk diameter (inches)	Target(s)	Occupied	Tree health	Canopy quality	Defect (s)	Disease/ Pest	Hazard rank	Primary action	Interior Tree	Tag location	Comments	Photo
52	*Acer macrophyllum*	61	trail	freq	poor	topped	B T	observed	Low	Monitor	Yes	south	Wounded branch collar	22
53	*Arbutus menziesii*	17	trail	freq	dead	dieback	T C	observed	very high	remove	No	north	dying	23
54	*Populus balsamifera*	40	trail	freq	fair	dieback	B	none seen	very high	prune	No	north	Trim dead branches overtrail	24
55	*Thuja plicata*	22	trail	freq	poor	dieback	T	observed	very high	trim	no	west	Leader dieback	25
56	*Pseudotsuga menziesii*	49	trail	some	dead	dieback	B T C	observed	very high	reduce - habitat tree	No	east	Bark peeling/ snag/ noted at nature center	26
57	*Pseudotsuga menziesii*	60	trail	some	poor	dieback	T C	observed	very high	inspect - resistograph	No	east	Fire damaged trunk	27,28, 29
58	*Alnus rubra*	15	trail	some	poor	dieback	T R	observed	low	Monitor	Yes	east	Thinning foliage/ leader dieback/ leader may fail	30,31
59	*Pseudotsuga menziesii*	52	trail	freq	fair	dieback	B T	observed	low	inspect	Yes	north	Check structural strength	32,33
60	*Acer macrophyllum*	12	trail	some	fair	topped	B C R	none seen	Low	prune	Yes	north	hanger	34
61	*Pseudotsuga menziesii*	33	trail	some	poor	dieback	T C	observed	Low	inspect	Yes	north	Forked at 2'/ other leader already removed	35,36

ID	Species	Trunk diameter (inches)	Target(s)	Occupied	Tree health	Canopy quality	Defect (s)	Disease/ Pest	Hazard rank	Primary action	Interior Tree	Tag location	Comments	Photo
62	*Acer macrophyllum*	6	trail	some	dead	dieback	T	observed	Low	Monitor	Yes	south	Bark peeling/ forked at base, east fork alive	37
63	*Pseudotsuga menziesii*	29	trail	some	fair	dieback	T C	observed	Low	inspect	Yes	east		38,39
64	*Thuja plicata*	49	building	never	dead	dieback	T C	observed	Low	Monitor	Yes	west	Unoccupied house in hatchery/ leader dead	40
65	*Thuja plicata*	33	building	never	dead	dieback	T C	observed	low	Monitor	Yes	west	Unoccupied house in hatchery/ leader dead	41
66	*Thuja plicata*	53	trail	freq	dead	dieback	B T C	observed	Low	Monitor	Yes	south	snag	42,43
67	*Sequoia sempervirens*	40	picnic table	always	fair	dieback		none seen	high	monitor	No	west	Leader dieback	44,45
68	*Fraxinus species*	18	trail	freq	fair	dieback	B C R	none seen	high	prune	No	east	Trim dead branches over trail	46-49
69	*Fraxinus species*	23	trail	freq	fair	dieback	B C R	none seen	high	prune	No	east	Trim dead branches over trail	46-49
70	*Fraxinus species*	19	trail	freq	fair	dieback	B R	none seen	high	prune	No	west	Trim dead branches over trail	46-49
71	*Acer macrophyllum*	59	trail	some	fair	asymet	B T	none seen	very high	prune	No	east	Trim dead branches over trail/ remove hanger	50,51

ID	Species	Trunk diameter (inches)	Target(s)	Occupied	Tree health	Canopy quality	Defect (s)	Disease/ Pest	Hazard rank	Primary action	Interior Tree	Tag location	Comments	Photo
72	*Arbutus menziesii*	24,23	road	always	fair	dieback	T C	observed	very high	prune	No	west	Forked at 2’	52,53, 54,55
73	*Thuja plicata*	40.5,26	parking	always	fair	dieback	B	observed	very high	resistograph, monitor	No	south		56
74	*Thuja plicata*	22	parking, road	always	fair	dieback	B T C	observed	very high	resistograph, monitor	No	north		57
75	*Pseudotsuga menziesii*	47.5	playground, path	always	good	-	B T C R	observed	very high	remove hanger	No	west	remove hanger	58,59
76	*Pseudotsuga menziesii*	49	parking, road	always	poor	asymet	B T C	observed	very high	resistograph, monitor	No	south		60
77	*Arbutus menziesii*	9.5	road	always	dead	dieback	B T C	observed	very high	remove	No	east		61
78	*Alnus rubra*	16,8	road	always	poor	dieback	T C R	observed	very high	remove	No	east	Forked at base	62
79	*Arbutus menziesii*	23	picnic table	some	dead	dieback	T C	observed	very high	monitor	No	south		63
80	*Arbutus menziesii*	7	road	always	dead	dieback	B T	none seen	very high	remove hanger	No	north	Remove hanger	64
81	*Arbutus menziesii*	26	trail, road	always	dead	dieback	B T C R	observed	very high	remove	No	north	Located at base of Doug. Fir	65,66
82	*Pseudotsuga menziesii*	76	parking, road	always	fair	-	B T C	observed	high	resistograph, monitor	No	east	Fire-damaged trunk, large spiders. Remove hangers in adjacent madrona	68
83	*Alnus rubra*	13	road	always	dead	dieback	T C R	none seen	high	remove	No	north	Dead	69

ID	Species	Trunk diameter (inches)	Target(s)	Occupied	Tree health	Canopy quality	Defect (s)	Disease/ Pest	Hazard rank	Primary action	Interior Tree	Tag location	Comments	Photo
84	*Alnus rubra*	17.5	picnic table, road	freq	dead	dieback	B T R	observed	very high	reduce - habitat tree	No	east	Dead/ bark peeling	70
85	*Pseudotsuga menziesii*	26	picnic table	some	good	-	B	none seen	high	prune	No	east	Remove 2 hangers	71,72

KEY

Defects[i]

B Branch
T Trunk
C Crown
R Roots.

NOTE; Tree locations are indicated on VMP maps at end of Addenda. Hazard tree screening was performed by Parks Urban Forestry staff arborist. Placement on this list does not suggest that the tree will ultimately be reduced. Many potentially hazardous situations can be managed through regular monitoring and light pruning. If a tree must be reduced, Parks will make every effort to maintain significant portions of the tree in the upright position, and will distribute the rest on the ground and in the surrounding planted areas

Seward Park Vegetative Management Plan

HAZARD TREE SURVEY